Expert Systems with Applications

An International Journal

LIST OF CONTENTS
AND
AUTHOR INDEX
VOLUME 1, 1990

Pergamon Press
New York Oxford Beijing Frankfurt Sao Paulo Sydney Tokyo Toronto

EXPERT SYSTEMS WITH APPLICATIONS

An International Journal

EDITOR-IN-CHIEF

Jay Liebowitz, D.Sc.
Department of Management Science
George Washington University
Washington, DC 20052

EDITORIAL ADVISORY BOARD

Edward Feigenbaum
Stanford University, USA

Lance B. Eliot
University of Southern California, USA

Y. T. Chien
National Science Foundation, USA

Dianne C. Berry
University of Oxford, UK

Dan Yurman
EG & G Idaho, USA

Walter Reitman
Rensselaer Polytechnic Institute, USA

Shri K. Goyal
GTE Laboratories, USA

Daniel E. O'Leary
University of Southern California, USA

Richard G. Vedder
University of North Texas, USA

James L. Rash
NASA Goddard Space Flight Center, USA

Louis L. Odette
Applied Expert Systems, Inc., USA

Randall Shumaker
U.S. Navy Center for Applied Research in Artificial Intelligence, USA

David Bendel Hertz
University of Miami, USA

A. Desai Narasimhalu
National University of Singapore

Patricia Lightfoot
NASA Goddard Space Flight Center, USA

Larry Harris
AI Corporation, USA

Mark Fox
Carnegie-Mellon University, USA

Jae Kyu Lee
Korea Advanced Institute of Science and Technology

I. Burhan Turksen
University of Toronto, Canada

David J. Gorney
Rawson Technologies, Inc., USA

Ernest H. Forman
George Washington University, USA

David King
Execucom Systems Corporation, USA

Roar Fjellheim
Computas Expert Systems, Norway

Milton White
International Association of Knowledge Engineers, USA

Jon R. Wright
AT&T Bell Laboratories, USA

Roy Rada
University of Liverpool, England

John P. Coyne
George Washington University, USA

John H. Carson
George Washington University, USA

Daniel Schutzer
Citicorp Investment Bank, USA

Paul Harmon
Harmon Associates, USA

Francisco J. Cantu
Instituto Tecnologico y de Estudios Superiores de Monterrey, Mexico

Masao Matsumoto
NEC Corporation, Japan

Patrick F. Perez
Neuron Data, USA

Brian Gaines
University of Calgary, Canada

Peter E. Hart
Syntelligence, USA

Michel Clerget
Cognitech, France

Kenneth J. Fordyce
IBM, USA

James R. Slagle
University of Minnesota, USA

Eliot Weinman
Software Productivity Group, USA

Randall Davis
Massachusetts Institute of Technology, USA

David J. Mischelevich
Viewpoint Engineering, USA

E. Balagurusamy
National Centre for Expert Systems, India

Steven H. Kim
Massachusetts Institute of Technology, USA

Dietter Specht
IPK/Berlin, West Germany

Vladimir Milacic
University of Belgrade, Yugoslavia

N. Rao Machiraju
Apple Computer, Inc., USA

Hans Bergkvist
ATTEXOR S. A., Switzerland

Laura C. Davis
U.S. Navy Center for Applied Research in Artificial Intelligence, USA

Daniel De Salvo
Intellimetrix, USA

Jerald Feinstein
MITRE, USA

Efraim Turban
Eastern Illinois University, USA

Editorial Office: Jay Liebowitz, School of Government and Business Administration, Department of Management Science, George Washington University, Washington, DC 20052.

Publishing, Subscription, and Advertising Offices: Pergamon Press, Inc., Fairview Park, Elmsford, New York 10523, USA; or Pergamon Press plc. Headington Hill Hall, Oxford OX3 0BW, England.

Published Quarterly. *Annual institutional subscription rate* (1991): US$125.00, *Two-year institutional subscription rate* (1991/92): US$237.50. *Personal subscription rate* (1990): US$45.00. Prices are subject to change without notice. Notify 8 weeks in advance of address change with a copy of the subscription mailing label. Back issues of all previously published volumes, in both hard copy and on microform, are available direct from Pergamon Press.

Copyright © 1990 Pergamon Press plc.

Copyright Notice. It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature, and translations. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

Photocopying information for users in the U.S.A. The Item-Fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

Permission for other use. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for copying. Please contact the Subsidiary Rights Manager at either Pergamon Press Inc. or Pergamon Press, plc.

The Item-Fee Code for this publication is: 0957-4174/90 $3.00 + .00.

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

Printed in the USA.

LIST OF CONTENTS

Volume 1, Number 1 1990

CONTENTS

Jay Liebowitz	1	*Editorial:* The Maturing Process of Expert Systems
Jae Kyeong Kim **Boo Sik Kang** **Soung Hie Kim**	3	Decision-Theoretic Approach to a Knowledge-Based Clinical System
Daniel Schutzer	17	Business Expert Systems: The Competitive Edge
Dave King	23	Intelligent Decision Support: Strategies for Integrating Decision Support, Database Management, and Expert System Technologies
Jae Kyu Lee **Sang Bong Oh** **Jung Cheol Shin**	39	UNIK-FCST: Knowledge-Assisted Adjustment of Statistical Forecasts
Roy Rada **Paul E. S. Dunne** **Judith Barlow**	51	EXPERTEXT: From Semantic Nets to Logic Petri Nets
Paul Alpar	63	Toward Structured Expert Systems Development
Randall Shumaker **Laura C. Davis**	71	Expert Systems at the Navy Center for Applied Research in Artificial Intelligence
David Bendel Hertz	79	The Knowledge Engineering Basis of Expert Systems
	85	NTIS Section
	I	Software Survey Section
	V	New Patents

Volume 1, Number 2 1990

CONTENTS

Ching Y. Suen **Peter D. Grogono** **Raijan Shinghal** **François Coallier**	93	Verifying, Validating, and Measuring the Performance of Expert Systems
Robert J. Mockler	103	Using Knowledge-Based Systems for Teaching and Performing Knowledge-Based Systems Development

Gian Piero Zarri	117	A High-Level Representation Language for the Construction and Use of Large Knowledge Bases
Jon R. Wright **Gregg T. Vesonder**	127	Expert Systems in Telecommunications
Valerie J. Calderbank	137	Expert Systems in the United Kingdom Nuclear Industry
John F. Affisco **Mahesh Chandra**	147	Quality Assurance and Expert Systems—A Framework and Conceptual Model
José Cuena **Ana García-Serrano** **Javier Marquez**	155	CYRCE: A Pattern of Knowledge Representation and Knowledge Acquisition for Decision on Personal Loans
W. D. Potter **T. H. Tidrick** **T. M. Hansen** **L. W. Hill** **D. E. Nute** **L. M. Fried** **T. W. Leigh**	161	SLING: A Knowledge-Based Product Selector
T. C. Tan **P. Smith** **M. Pegman**	171	RADA—A Research and Development Advisor Incorporating Artificial Intelligence Techniques and Expert System Approaches
Chen You Qi	179	A Two-Stage Inference Strategy in Real-Time Expert Systems
Jay Liebowitz	183	Expert Configuration Systems: A Survey and Lessons Learned
		Special Section: Conference Update
Paul Alpar **Yair M. Babad**	189	Conference: Successful Implementation of Expert Systems in Large Organizations
	193	NTIS Section
	I	Software Survey Section
	V	New Patents

Volume 1, Number 3 1990

CONTENTS

SPECIAL ISSUE
VERIFICATION AND VALIDATION
OF KNOWLEDGE-BASED SYSTEMS

Chris Culbert	197	Guest Editor's Note
Kirstie L. Bellman	199	The Modeling Issues Inherent in Testing and Evaluating Knowledge-Based Systems
C. L. Chang **J. B. Combs** **R. A. Stachowitz**	217	A Report on the Expert Systems Validation Associate (EVA)

Robert M. O'Keefe **Sunro Lee**	231	An Integrative Model of Expert System Verification and Validation
Monica M. Constantine **Jacob W. Ulvila**	237	Testing Knowledge-Based Systems: The State of the Practice and Suggestions for Improvement
Lance A. Miller	249	Dynamic Testing of Knowledge Bases Using the Heuristic Testing Approach
Theodore A. Linden	271	A Meta-Level Software Development Model That Supports V&V for AI Software
Britt W. Barrett	281	A Hypothetical Application of the Statistical Modeling and Estimation of Reliability Functions for Software (SMERFS) to Knowledge-Based Systems (KBSs)
Christopher Landauer	291	Correctness Principles for Rule-Based Expert Systems
William T. Wood **Elaine N. Frankowski**	317	Verification of Rule-Based Expert Systems
	323	NTIS Section
	I	Software Survey Section
	V	New Patents

Volume 1, Number 4 1990

CONTENTS

SPECIAL ISSUE
INTEGRATION AND COMPETITION OF AI
WITH QUANTITATIVE METHODS FOR DECISION SUPPORT

Jae K. Lee	329	*Editorial:* Integration and Competition of AI with Quantitative Methods for Decision Support
Efraim Turban **Robert Trippi**	335	Integrating Expert Systems and Operations Research: A Conceptual Framework
Lothar Winkelbauer **Steven Markstrom**	345	Symbolic and Numerical Methods in Hybrid Multi-Criteria Decision Support
Nasir Ghiaseddin **Khalil Matta** **Diptendu Sinha**	359	The Design of an Expert System for Inventory Control
Jae Sik Lee **Christopher V. Jones** **Monique Guignard**	367	MAPNOS: Mathematical Programming Formulation Normalization System
David A. Kendrick	383	Parallel Model Representations
Ting-Peng Liang **John S. Chandler** **Ingoo Han**	391	Integrating Statistical and Inductive Learning Methods for Knowledge Acquisition

Sang Bin Lee **Seung Hyun Oh**	403	A Comparative Study of Recursive Partitioning Algorithm and Analog Concept Learning System
James W. Denton **Ming S. Hung** **Barbara A. Osyk**	417	A Neural Network Approach to the Classification Problem
W. D. Potter **J. A. Miller** **O. R. Weyrich**	425	A Comparison of Methods for Diagnostic Decision Making
	437	NTIS Section
	445	List of Contents and Author Index Volume 1, 1990
	I	Software Survey Section
	V	New Patents